Space Weather Forecast

Issued on Sunday, 28 July 2024 at 00:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1-G2/Minor to Moderate Storms expected into Day 2 and Day 3 (29-30 Jul) given potential CME (coronal mass ejection) arrivals. Isolated R1-R2 Minor to Moderate Radio Blackouts likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with several M-class flare, one of which was an M4.2 peaking at 27/0237 UTC from the cluster of regions located in the southeast. The most recent one was an M3.4 observed at 27/1839 UTC from the largest region on the disc, this region having contributed to two other M-class flares in the last 24 hours.

There are currently up to ten sunspot regions on the solar disc. The largest and most complex region is now transiting in the southwest quadrant. Its leading portion is showing signs of growth with an agglomeration of spots around a large penumbra but its trailing portion is becoming faint although it continues to exhibit a delta spot. The cluster of sunspot regions transiting across the southeast quadrant continues to grow in size and complexity, with intricate magnetic looping bringing additional instability. All other remaining regions appear small, simple and/or largely unchanged.

A large halo CME (Coronal Mass Ejection) was observed on satellite imagery around 27/0500 UTC, heading to the east. The source is still unknown but the analysis has at least managed to establish that this CME is most likely far-sided. A partial halo was also subsequently observed shortly after 27/0600 UTC. It may be attributed to AR3762 since dimming was observed at a similar time but the signal is contaminated by the large far-sided event, resulting in a low confidence analysis with an arrival at Earth possible at the end of 29 July or begining of 30 July.

Solar Wind / Geomagnetic Activity: Solar winds have steadily declined through the period, from 500 km/s to 400 km/s.. The Interplanetary magnetic field, Bt, was mostly weak. The north-south component, Bz, was slightly unsettled at first but became weaker and largely positive later in the period. Resulting geomagnetic activity was generally Quiet to Unsettled (Kp 1-3), with a provisional Active (Kp4) interval observed between 27/1200-1500 UTC.

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to be Low to Moderate with further M-class flares likely and and slight chance of isolated X-class flares.

Solar Wind /Geomagnetic Activity: Current solar wind speeds are thought likely to gradually decline in the absence of CME influence over the next 36 hours, perhaps down to slow-ambient levels. Geomagnetic activity is therefore expected to be generally Quiet to Unsettled at first but to increase to G1-G2 Minor to Moderate storm conditions at the end of Day 2 and into Day 3 (29-

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30 July), with a slight chance of G3 Strong Storm given the potential for the aforementioned CME arrival.

Energetic Particles / Solar Radiation: Solar radiation is most likely to remain at background levels. However, there is a slight chance of rising above the S1/Minor Radiation Storm threshold in response to any notable flares.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	60	60	10
Strong	G3	No	1	20	15	1
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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